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AF/1639 #

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ATTORNEY DOCKET NO. **10010464-1** IPW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Svetlana Shchegrova

Serial No.: 10/061,800 **Examiner:** My Chau T Tran

Filing Date: January 30, 2002 **Group Art Unit:** 1639

Title: ERROR CORRECTION IN ARRAY FABRICATION

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on September 2, 2005 .

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) **$500.00**.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)(1)-(5)) for the total number of months checked below:

☐	one month	$ 120.00
☐	two months	$ 450.00
☐	three months	$1020.00
☐	four months	$1590.00

☐ The extension fee has already been filled in this application.

☒ (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account **50-1078** the sum of $500.00 . At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account **50-1078** pursuant to 37 CFR 1.25.

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Respectfully submitted,

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APPELLANTS' BRIEF Address to: Mail Stop Appeal Brief-Patents Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450	Application Number	10/061,800
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	First Named Inventor	Svetlana Shchegrova
	Examiner	My-Chau T. Tran
	Group Art	1639
	Title: *Error Correction In Array Fabrication*	

Sir:

This Brief is filed in support of Appellants' appeal from the Examiner's Rejection dated June 2, 2005. No claims have been allowed and claims 1-33 are pending. Claims 1-33 are appealed. A Notice of Appeal was filed on September 2, 2005. As such, this Appeal Brief is timely filed.

The Board of Appeals and Interferences has jurisdiction over this appeal pursuant to 35 U.S.C. §134.

The Commissioner is hereby authorized to charge deposit account number 50-1078, order no. 10010464-1 to cover the fee required under 37 C.F.R. §1.17(c) for filing Appellants' brief. In the unlikely event that the fee transmittal or other papers are separated from this document and/or other fees or relief are required, Appellants petition for such relief, including extensions of time, and authorize the Commissioner to charge any fees under 37 C.F.R. §§ 1.16, 1.17 and 1.21 which may be required by this paper, or to credit any overpayment, to deposit account number 50-1078, order no. 10010464-1.

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REAL PARTY IN INTEREST

The inventors named on this patent application assigned their entire rights to the invention to Agilent Technologies, Inc.

RELATED APPEALS AND INTERFERENCES

There are currently no other appeals or interferences known to Appellants, the undersigned Appellants' representative, or the assignee to whom the inventors assigned their rights in the instant case, which would directly affect or be directly affected by, or have a bearing on the Board's decision in the instant appeal.

STATUS OF CLAIMS

The present application was filed on January 30, 2002 with claims 1-48. During the course of prosecution, claims 34-48 were canceled. Accordingly, claims 1-33 are pending and stand rejected in the present application, all of which are appealed herein.

STATUS OF AMENDMENTS

No amendments to the claims were filed subsequent to issuance of the Final Rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention is drawn to methods for fabricating a chemical array that provide for error correction during the fabrication process.

Below is a description of each appealed claim and where support for each can be found in the specification.

Independent claim 1 claims a method of fabricating a chemical array using a head system with multiple groups of drop dispensers, a transport system to move the head system with respect to a substrate, and a processor to dispense droplets from dispensers during operation of the transport system in a pattern along a selected path for each group (see specification at page 3, lines 21-25). The method comprises a) loading the dispensers with fluid such that each dispenser group has at least one set of redundant dispensers loaded with a same fluid (see specification at page 3, lines 25-27), b) dispensing drops from the dispensers to identify an error in one or more

dispensers (see specification at page 3, line 27), c) moving a first dispenser of each set in each group along the selected path for that group while dispensing drops from non-error first dispensers of the sets in at least part of the pattern along the selected path for each group (see specification at page 4, lines 4-6), d) moving a second dispenser of the sets in each group along the selected path for that group while dispensing drops from a non-error second dispenser of a set having an identified error first dispenser, in at least part of the pattern for the selected path of the first group (see specification at page 3, line 31-page 4, line 4), and e) repeating steps (a) through (d) at least once (see specification at page 4, lines 6-7).

Claim 2 depends from claim 1 wherein in step (d) drops are dispensed from each second dispenser of multiple groups in at least part of the pattern for the selected path of the same group (see specification at page 4, lines 9-11).

Claim 3 depends from claim 2 wherein dispensers within a set of redundant dispensers communicate with a common reservoir for that set (see specification at page 4, lines 11-13).

Claim 4 depends from claim 1 wherein the dispensers are pulse jets (see specification at page 1, lines 25-29).

Claim 5 depends from claim 2 wherein in step (d) the drops are dispensed from at least one second dispenser of a set of redundant dispensers, in the complete pattern for the first dispenser of the same set (see specification at page 4, lines 13-14).

Independent claim 6 claims a method of fabricating a chemical array using a head system with multiple groups of dispensers, the members of each group being arranged in multiple series extending in a first direction and multiple sets; a transport system to move the head system with respect to a substrate with different series following respective paths, series from different groups which can simultaneously move along the selected paths for their groups forming a dispenser frame; a processor to dispense drops from dispensers during operation of the transport system, in a pattern along a selected path for each group (see specification at page 4, lines 15-22). The method comprises a) loading the dispensers with fluid such that dispensers within each set of the groups are loaded with a same fluid (see specification at page 4, lines 22-23), b) dispensing drops from the dispensers to identify an error in one or more dispensers (see specification at page 4, line 24), c) moving a first dispenser frame along the

selected paths for the groups while dispensing drops from non-error dispensers of the first frame in at least part of the patterns along the selected paths for the groups (see specification at page 4, lines 24-27), d) when an error dispenser is detected in the first frame, moving a further frame along the selected paths for the groups while dispensing drops from a non-error dispenser of the further frame located in the same set as the error dispenser, in at least part of the patterns along the selected paths for the groups (see specification at page 4, lines 27-30), and e) repeating (a) through (d) at least once (see specification at page 4, lines 30-31).

Claim 7 depends from claim 6 wherein the multiple sets extend in a second direction sideways to the first direction (see specification at page 12, lines 14-16).

Claim 8 depends from claim 7 wherein the selected paths extend in the first direction (see specification at page 5, lines 8-10).

Claim 9 depends from claim 7 wherein the dispensers of the head system move in unison (see specification at page 5, lines 8-10).

Claim 10 depends from claim 7 wherein the first and further dispenser frames are moved in turn along the selected paths (see specification at page 5, lines 10-11).

Claim 11 depends from claim 8 wherein the head is displaced sideways to the selected paths to bring each further frame into alignment with the selected paths (see specification at page 5, lines 11-13).

Claim 12 depends from claim 8 wherein the first frame is selected based on the number of non-error dispensers in the first frame (see specification at page 5, lines 13-14).

Claim 13 depends from claim 8 wherein in (d) when error dispensers are detected in a further frame, then multiple further frames are moved along the selected paths for the groups while dispensing drops from non-error dispensers of each of the further frames in at least part of the patterns along the selected paths for the groups (see specification at page 5, lines 6-7).

Claim 14 depends from claim 13 wherein drops are dispensed from non-error dispensers in the same sets as the error dispensers (see specification at page 4, line 27-page 5, line 7).

Claim 15 depends from claim 8 wherein in (c) and (d) frames so moved are each selected as a frame among previously non-selected frames which has the highest

number of non-error dispensers in sets not containing a non-error dispenser in a previously selected frame (see specification at page 5, lines 14-16).

Claim 16 depends from claim 15 wherein when more than one frame has the highest number then selecting from among such highest number frames a frame which has a best non-error dispenser in a set not containing a non-error dispenser in a previously selected frame, wherein the best non-error dispenser more closely meets a predetermined criterion than a non-error dispenser of another highest number frame (see specification at page 5, lines 16-21).

Claim 17 depends from claim 15 additionally comprising, when a set contains a non-error dispenser in more than one selected frame, then determining a best dispenser from among those non-error dispensers which more closely meets a predetermined criterion and dispensing drops in at least part of the pattern along the selected path for that group in which that best dispenser is located when the frame containing that best dispenser is moved along the selected path for that group (see specification at page 5, lines 21-26).

Claim 18 depends from claim 16 wherein the predetermined criterion is a drop size (see specification at page 5, lines 26-27).

Claim 19 depends from claim 16 wherein the predetermined criterion is a drop placement (see specification at page 5, lines 26-27).

Claim 20 depends from claim 7 wherein the dispensers are pulse jets (see specification at page 1, lines 25-29).

Claim 21 depends from claim 12 wherein dispensers in each of multiple sets of each of multiple groups, communicate with a corresponding common reservoir for that column (see specification at page 12, lines 20-21).

Claim 22 depends from claim 7 wherein the dispensing of (b) is performed after each loading in (a) and before the moving and dispensing of (c) and (d) (see specification at page 5, lines 27-31).

Claim 23 depends from claim 7 wherein the series are arranged in rows (see specification at page 12, lines 5-8).

Claim 24 depends from claim 7 wherein the sets are arranged in columns (see specification at page 12, lines 14-16).

Independent claim 25 claims a method of fabricating a chemical array using a

head system with multiple groups of dispensers, the members of each group being arranged in multiple series extending in a first direction and multiple sets extending in a second direction sideways to the first direction; a transport system to move the head system with respect to a substrate with different series following respective paths, series from different groups which can simultaneously move along the selected paths for their groups forming a dispenser frame; a processor to dispense drops from dispensers during operation of the transport system, in a pattern along a selected path for each group (see specification at page 4, lines 15-22; and page 12, lines 14-16). The method comprises a) loading the dispensers with fluid such that dispensers within each set of the groups are loaded with a same fluid (see specification at page 4, lines 22-23), b) dispensing drops from the dispensers to identify an error in one or more dispensers (see specification at page 4, line 4), c) moving a first frame along the selected paths for the groups while dispensing drops from non-error dispensers of the first frame in at least part of the patterns along the selected paths for the groups (see specification at page 4, lines 24-27), and d) when an error dispenser is detected in the first frame, then multiple selected frames are moved along the selected paths for the groups while dispensing drops from non-error dispensers of each of the frames in at least part of the patterns along the selected paths for the groups, wherein each of the frames so moved is selected as the frame among previously non-selected frames which has the highest number of non-error dispensers in sets not containing a non-error dispenser in a previously selected frame (see specification at page 4, line 31-page 5, line 6).

Claim 26 depends from claim 25 wherein the selected paths extend in the first direction (see specification at page 5, lines 8-10).

Claim 27 depends from claim 25 wherein the dispensers of the head system move in unison (see specification at page 5, lines 8-10).

Claim 28 depends from claim 25 wherein the first and further dispenser frames are moved in turn along the selected paths (see specification at page 5, lines 10-11).

Claim 29 depends from claim 26 wherein the head is displaced sideways to the selected paths to bring each further frame into alignment with the selected paths (see specification at page 5, lines 11-13).

Claim 30 depends from claim 25 wherein the dispensers are pulse jets (see specification at page 1, lines 25-29).

Claim 31 depends from claim 25 wherein dispensers in each of multiple sets of each of multiple groups, communicate with a corresponding common reservoir for that column (see specification at page 12, lines 20-21).

Claim 32 depends from claim 25 wherein the series are arranged in rows (see specification at page 12, lines 5-8).

Claim 33 depends from claim 26 wherein the sets are arranged in columns (see specification at page 12, lines 14-16).

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

I. Claims 1-3, 5-19, 21-29 and 31-33 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. (US 5,807,522) and Tisone et al. (US 6,063,339).

II. Claims 4, 20 and 30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Brown et al. (US 5,807,522) and Tisone et al. (US 6,063,339) and further in view of Gamble et al. (US 5,958,342).

ARGUMENT

I. Claims 1-3, 5-19, 21-29 and 31-33 are not obvious under 35 U.S.C. 103(a) over Brown et al. (US 5,807,522) and Tisone et al. (US 6,063,339).

With respect to rejections made under 35 U.S.C. § 103(a), MPEP § 2142 states:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

It is respectfully submitted that the Examiner's *prima facie* case of obviousness is deficient because the combined teachings of the cited prior art fail to teach or suggest all the claim limitations of the rejected claims. Below are the contentions of the Appellant with respect to the grounds of rejection made by the Examiner.

Claims 1, 2 and 5

Independent claim 1 and dependent claims 2 and 5 claim an array fabrication method which employs:

- a head system with multiple groups of drop dispensers;
- a transport system to move the head system with respect to a substrate; and
- a processor to dispense droplets from dispensers during operation of the transport system, in a pattern along a selected path for each group.

The method of fabrication an array claimed in claim 1 includes the steps of:

- (step a) loading the dispensers with fluid such that each dispenser group has at least one set of redundant dispensers loaded with a same fluid;
- (step b) dispensing drops from the dispensers to identify an error in one or more dispensers;
- (step c) moving a first dispenser of each set in each group along the selected path for that group while dispensing drops from non-error first dispensers of the sets in at least part of the pattern along the selected path for each group;
- (step d) moving a second dispenser of the sets in each group along the selected path for that group while dispensing drops from a non-error second dispenser of a set having an identified error first dispenser, in at least part of the pattern for the selected path of the first group; and
- (step e) repeating (step a) through (step d) at least once.

The Appellants submit that at least the underlined sections above are not taught or suggested by the references cited by the Examiner.

To illustrate the claimed array fabrication method, a representative embodiment is described below. The head system claimed contains multiple dispensers configured (again, in an exemplary fashion) as shown in Figure 4A of the subject specification. For clarity, Figure 4A has been reproduced below with additional annotation (specifically, a *Group* [in the rectangle] and a *Set* [in the oval] of dispensers are indicated).

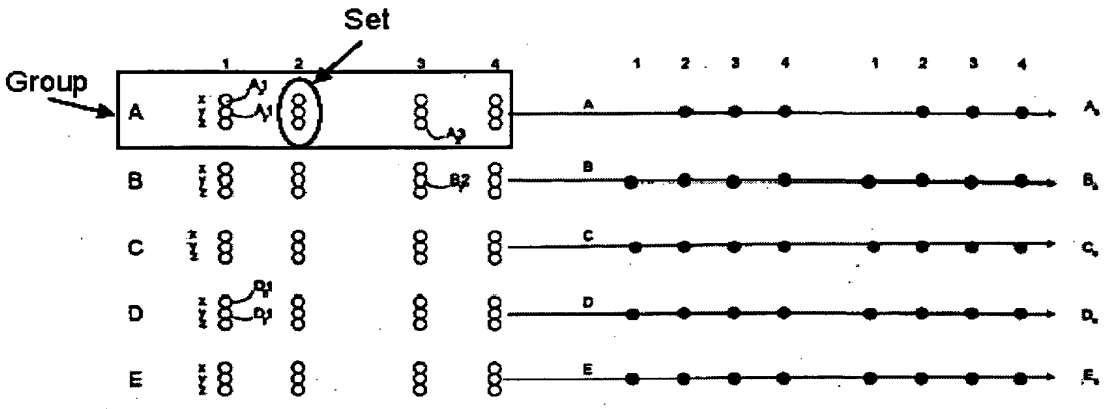

FIG. 4A

As shown above and described in the specification, the head systems claimed in the subject application have multiple *Groups* of dispensers (i.e., at least two). Each *Group* of dispensers of the claimed head system (e.g., Group A [in the rectangle]) contains at least one *Set* of dispensers, with each *Set* containing multiple dispensers (e.g., dispensers Ax2, Ay2 and Az2 make up *Set* A2 [in the oval]). As will be clear from the discussion below, a head configuration of this layout is required to carry out the claimed array fabrication methods.

As recited in the claimed methods, the dispensers are loaded such that each *Set* of dispensers contains the same fluid (step *a*), the dispensers are tested to identify dispenser errors (step *b*), and the head system is moved such that a first dispenser of each set (e.g., dispensers in row y of the *Sets*) travels along the selected path (the black lines on the right of Figure 4A indicate the selected path) while depositing drops from the non-error dispensers (step *c*). The deposition of drops is depicted in Figure 4A on the right, with black dots representing deposited drops from specific dispensers of the head system. As can be seen in this example, dispenser Ay1 (labeled open circle on the left) did not dispense a drop at its intended location (i.e., at position A1 on the right) because it is an error dispenser. In step *d* of the claimed methods, a second non-error dispenser from the *Sets* in each *Group* is moved along the same selected path (e.g., the dispensers in row x of the *Sets* would follow the selected path) and dispenses drops where one was not

deposited by an error dispenser of the same *Set* (e.g., non-error dispenser Ax1 deposits a drop where error dispenser Ay1 failed to do so). In step *e* of the claimed methods, steps *a* to *d* are repeated as necessary to fabricate the array.

As is clear from the above description, this method of fabricating an array utilizes redundant dispensers (i.e., *Sets* of dispensers) in such a way that a drop that was not deposited by a first defective (or error) dispenser of a *Set* is deposited by a second (or third) non defective (or non-error) dispenser of the same *Set*. The configuration of dispensers makes the claimed method possible.

In maintaining the rejection of the pending claims, the Examiner asserts that Brown et al. disclose each of the elements of the claimed invention except error detection and that Tisone et al. remedies this deficiency. The Appellants respectfully disagree with the Examiner's interpretation of the teachings of Brown et al. and Tisone et al. and submit that the combination of these references fails to teach or suggest elements of the claimed invention (e.g., such as at least those underlined above).

The Examiner asserts that Brown et al. disclose a method for array fabrication that utilizes a dispensing device that contains a plurality of dispensers, the method including the steps of loading the dispensers with a reagent solution, moving the dispensers to a selected position to dispense the solution, and repeating the process to fabricate an array. In asserting that Brown et al. disclose dispensers as claimed in the subject application, the Examiner cites col. 4 lines 12 to 15 which reads:

> The dispensing device in the apparatus may be one of a plurality of such devices which are carried on the arm for dispensing different analyte assay reagents at selected spaced array positions.

This passage merely states that one can utilize multiple dispensing devices (each device having a single dispenser, see Figure 1 of Brown et al.) without providing any teaching as to how they are to be arranged or how they should be loaded with fluid. As such, Brown et al. fails to teach or suggest the configuration of dispensers as claimed. Specifically, Brown et al. fail to disclose a head system containing multiple *Groups* of dispensers with each *Group* containing at least one *Set* of dispensers as claimed (see exemplary Figure 4A, above). As stated

previously, without the dispensers configured in *Groups* of *Sets*, it is not possible to perform the array fabrication method as claimed. Indeed, without having such a configuration of dispensers it is impossible to complete even the first step of the claimed array fabrication method (in which the dispensers are loaded such that the dispensers in each *Set* contain the same fluid).

Furthermore, the passage cited above specifically states that a *plurality of devices* (i.e., individual dispensers) are loaded with *different* reagents. The additional passages cited by the Examiner that assertedly disclose loading different dispensers with the same fluid (i.e., col. 3 lines 46-50 and col. 7 lines 55-59) merely recite steps by which a *single* dispenser can be loaded, washed, and re-loaded with a reagent solution. Therefore, the Appellants submit there is no teaching in Brown et al. of loading different dispensers with the same fluid.

Additionally, as acknowledged by the Examiner, Brown et al. fail to disclose any error identification step. Without this teaching, it is impossible for Brown et al. to disclose any of the remaining steps. Specifically, Brown et al. fail to disclose dispensing drops from non-error dispensers from a first dispenser of each *Set* because 1) Brown et al. provide no means through which an error or a non-error dispenser can be identified, and 2) no dispenser *Sets* as claimed are disclosed. It is likewise impossible for Brown et al. to disclose the remaining steps of the array fabrication method because 1) there is no way to determine where drops were not deposited by error dispensers, and 2) no second (i.e., non-error) dispensers of each *Set* are disclosed which can deposit drops at these locations.

Again, the Appellants submit that without disclosing the configuration of dispensers as is claimed, Brown et al. simply cannot disclose <u>any</u> of the steps of the array fabrication method claimed.

To remedy the deficiencies of Brown et al., the Examiner cites Tisone et al. for its asserted teaching of a dispenser error identification method. The Examiner also asserts that Tisone et al. discloses multiple dispensers as is claimed.

As detailed above, Brown et al. is fundamentally deficient in teaching a head system containing multiple *Groups* of dispensers each of which contains at least one

Set of redundant dispensers as is claimed in the subject methods (see Figure 4A above). In asserting that Tisone et al. discloses multiple dispensers as claimed, the Examiner cites col. 7 lines 61-67 which reads:

> It bears noting also that while only a single dispensing head 128 is shown, it is contemplated that multiple dispensing heads in linear or two-dimensional arrays can also be used with equal or improved efficacy. These may be provided and operated either in parallel as illustrated in FIG. 2 (ie. for multi-gang operation) or in another coordinated fashion, as desired.

The Appellants submit that this passage fails to teach or suggest the dispenser configuration as claimed. There is no mention of configuring the dispensers of a head system in multiple *Groups* with each *Group* containing at least one *Set* of redundant dispensers. The Examiner also cites col. 22 lines 7-31 as disclosing *Groups* with *Sets* of redundant dispensers as claimed. The relevant portion of this passage states:

> Alternatively, multiple dispensers 502 may be used either in parallel, as illustrated in FIG. 2, or independently of one another. Arrays of dispenser heads could also be configured together, spaced, for example, on 4.5 mm or 9 mm center-to-center, so as to provide array dispensing of 8, 16 or 64 drops simultaneously and/or in synchronous coordination. FIG. 2 illustrates a single continuous feed platform 500 configured with multiple dispensers 512 to handle one or more reagents. This particular dispensing apparatus configuration has significant advantages for continuous web production applications since one or more syringe pumps 512 can be operated in alternating succession while allowing the non-dispensing syringe pump to draw additional reagent from the reservoir or they can be configured independent of one another to dispense the same or different reagents simultaneously or in succession.

The Appellants submit that this passage does not teach or suggest a head configuration that can be used in performing the claimed methods of the subject application. This section merely states that dispensers may be configured in a number of undefined ways to achieve a desired deposition pattern of reagent(s) on a substrate. Specifically, this passage fails to disclose that *Sets* of dispensers are filled with the same reagent because neither *Sets* of redundant dispensers nor *Groups* of *Sets* of redundant dispensers that can function in the claimed methods have been taught or suggested. As detailed above, without a teaching of configuring dispensers as is claimed, one of skill in the art would not arrive at the claimed array

fabrication method.

As indicated above and stated by the Examiner, Brown et al. fail to teach dispenser error identification. To remedy this fundamental deficiency the Examiner cites col. 22 lines 7-31 (reproduced above) and col. 19, lines 1-13 of Tisone et al. which reads:

> Finer adjustments can then be made experimentally for a given production set up. This can be done, for example, by programming the dispensing apparatus to dispense known patterns of crossing or parallel lines, target patterns and/or the like, at particular locations on the substrate. By inspecting the resulting patterns, certain adjustments, such as phase lead or lag, can be made to the dispense data to compensate for noted errors. The experiment can be repeated as many times as needed. Optionally, sensors may be provided, such as temperature probes, viscosity sensing devices or other sensor devices, in order to provide real time automated feedback and adjustment of the dispenser.

As is clear from the passage above, the error identification method disclosed in Tisone et al. is directed to controlling specific parameters of valve deposition (e.g., timing) and does not teach identifying an error dispenser and dispensing only from non-error dispensers during array fabrication as is claimed. Instead, the deposition error method of Tisone et al. evaluates whether a drop is deposited in the desired location and, if it is not, adjustments are made to the parameters of valve deposition to correct it. In other words, there is no such thing as an "error dispenser" in Tisone et al. as claimed in the subject application. If a dispenser deposits erroneously, the method disclosed in Tisone et al. adjusts the parameters of dispensation and deposits fluid using the *same* dispenser.

In contrast, the method of the claimed invention identifies an "error dispenser" and does not deposit reagent using that dispenser, but rather dispenses fluid from a *second* (or third) non-error (i.e., functional) dispenser selected from the same redundant *Set* in which the error dispenser is found.

As such, when a dispenser is identified that has sub-optimal dispensing characteristics, Tisone et al. *fixes* that dispenser whereas the claimed invention uses a *different* (i.e., functional) dispenser. Therefore, the Appellants submit that Tisone et al. fails to teach or suggest this element of the claimed invention.

The Appellants submit that the combination of Brown et al. and Tisone et al.

fails to teach or suggest each and every element of the claimed invention. Specifically, these references fail to teach or suggest at least:

- a head system containing multiple *Groups* of dispensers each containing at least one *Set* of redundant dispensers;
- moving the head system along a path while depositing drops only from non-error dispensers; and
- using a second non-error dispenser of a *Set* to deposit a drop where a first error dispenser of the same *Set* failed to do so.

Because the combined teachings of Brown et al. and Tisone et al. fail to teach or suggest each and every element of the claimed invention, the Appellants submit that a *prima facie* case of obviousness has not been established for claims 1, 2 and 5.

Claim 3

Claim 3 depends from claim 2 and specifies that dispensers of a *Set* communicate with a common reservoir. In addition to the arguments provided above for the patentability of claims 1, 2 and 5 over Brown et al. and Tisone et al., the Appellants submit that the Examiner has provided no citation in either of the cited references which teach or suggest that dispensers of a *Set* communicate with a common reservoir. Therefore, the Appellants submit claim 3 is further distinguished over the asserted teachings of Brown et al. and Tisone et al.

Claim 6

Independent claim 6 claims a method of array fabrication that includes the limitations of independent claim 1, but with additional novel features. Specifically, claim 6 specifies that each of the multiple *Groups* of dispensers have multiple *Sets* that are arranged in multiple *Series* extending in a "first direction". An exemplary configuration is shown below in annotated Figure 4A, where *Series* Bx, By and Bz are shown in the elongated rectangles which represent the "first direction". Claim 6 also specifies that *Series* that move along the selected paths simultaneously from multiple *Groups* make up what is called a dispenser *Frame* (Frame Y is identified with arrows on annotated Figure 4A, below). The method of deposition in claim 6 is

similar to claim 1, but is tailored to the dispenser configuration claimed (shown in an exemplary fashion in Figure 4A below). Specifically, a first dispenser *Frame* is moved along selected paths while depositing drops at the desired locations (closed circles in Figure 4 below). Further *Frames* are then moved along the selected paths to deposit drops where first *Frame* error-dispensers failed to do so. For example, dispenser Ay1 failed to deposit a drop in Figure 4A. If dispenser Ax1 is a non-error dispenser, it could be used to deposit a drop where Ay1 failed to do so in a subsequent deposition step.

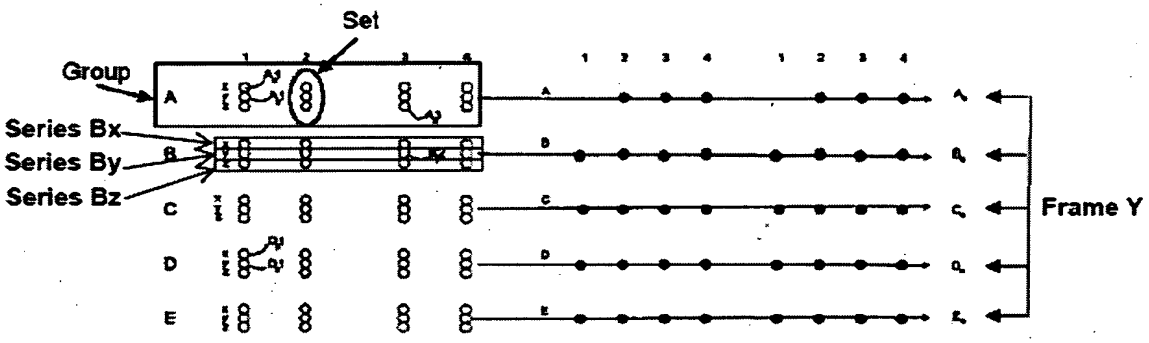

FIG. 4A

The Appellants submit that, in addition to the deficiencies discussed with regard to claim 1, the Examiner has provided no citation in either Brown et al. or Tisone et al. that teaches or suggests *Series* of dispensers or dispenser *Frames* as is claimed in claim 6. Therefore, the method of deposition claimed in claim 6 is neither taught nor suggested by the combination of the references.

Claims 7-11, 13, 14 and 22-24

Claim 7 depends from claim 6 and specifies that the *Sets* of dispensers extend in a direction sideways to the "first direction". Claims 8-11, 13, 14 and 22-24 depend directly or indirectly from claim 7 and specify additional relative positioning of dispensers, paths taken by the dispensers during reagent deposition, or intervening movements of the dispensers as claimed in claim 7.

In the exemplary dispenser orientation of Figure 4A , the "first direction" is horizontal (i.e., the direction of the *Series*) and as such the *Sets* of dispensers are

vertical. The Appellants submit that the Examiner has provided no citation in either Brown et al. or Tisone et al. that teaches or suggests that the *Sets* of dispensers are in a sideways orientation with respect to the "first direction". Indeed, the cited references fail even to teach *Sets* of dispensers as claimed and as such fail to teach or suggest relative positioning of *Sets* of dispensers or their movement during reagent deposition. Therefore, the Appellants submit claims 7-11, 13, 14 and 22-24 are further distinguished over the asserted teachings of Brown et al. and Tisone et al.

Claims 12, 15-19, 25-29, 32 and 33

Claims 12 and 15-19 depend indirectly on claim 7 and specify methods for choosing which *Frames* to use in the claimed array fabrication methods. Independent claim 25 claims a method for array fabrication that specifies *Frames* of dispensers (as discussed in the previous two sections) and also includes methods for choosing which *Frames* to use in each round of reagent deposition. Claims 26-29, 32 and 33 depend directly of indirectly from claim 25 and further specify additional relative positioning of dispensers, paths taken by the dispensers during reagent deposition, or intervening movements of the dispensers as claimed in claim 25.

The Appellants submit that because the cited references fail to teach or suggest dispenser *Frames* as is claimed (discussed above), they likewise fail to teach or suggest methods for choosing which *Frame* to use during successive steps of the claimed array fabrication process. Therefore, the Appellants submit claims 12, 15-19, 25-29, 32 and 33 are further distinguished over the asserted teachings of Brown et al. and Tisone et al.

Claims 21 and 31

Claim 21 depends from claim 12 and claim 31 depends from claim 25. Both of these claims specify that dispensers in each of the *Sets* communicate with a common reservoir. The Appellants submit that the Examiner has provided no citation in either of the cited references that teach or suggest that dispensers of a *Set* communicate with a common reservoir. Indeed, as discussed above, the cited

references fail even to teach *Sets* of dispensers as is claimed. Therefore, the Appellants submit claims 21 and 31 are further distinguished over the asserted teachings of Brown et al. and Tisone et al.

Given the significant deficiencies in the cited references in teaching or suggesting all of the elements of the claimed methods of the invention, the Appellants submit that the Examiner has failed to establish a *prima facie* case of obviousness and respectfully request reversal of this rejection.

II. Claims 4, 20 and 30 are not obvious under 35 U.S.C. 103(a) over Brown et al. (US 5,807,522) and Tisone et al. (US 6,063,339) and further in view of Gamble et al. (US 5,958,342).

The Examiner has acknowledged that neither Brown et al. nor Tisone et al. teach dispensers that are pulse jets. The Examiner asserts that Gamble et al. remedies the deficiencies in the teachings of Brown et al. and Tisone et al. because they disclose using pulse jet dispensers to distribute arrays of microspots.

However, as detailed above, the combined teachings of Brown et al. and Tisone et al. fail to teach or suggest numerous elements of the claims of the subject application above and beyond pulse jet dispensers. The Appellants submit that Gamble et al. fail to remedy *any* of these additional fundamental deficiencies in the teachings of Brown et al. and Tisone et al.

Because the combined teachings of Brown et al., Tisone et al. and Gamble et al. fail to teach or suggest each and every element of the claimed invention, the Appellants submit that a *prima facie* case of obviousness has not been established. As such, the Appellants respectfully request that this rejection be reversed.

SUMMARY

I. Claims 1-3, 5-19, 21-29 and 31-33 are patentable over Brown et al. (US 5,807,522) and Tisone et al. (US 6,063,339) under 35 U.S.C. 103(a) because these references fail to teach or suggest each and every element of the claimed invention. Specifically, Brown et al. and Tisone et al. fail to teach or suggest *Groups*, *Sets*, *Series* or *Frames* of dispensers as is claimed. Without such a teaching, these references simply cannot teach the error correction array fabrication methods of the claimed invention.

II. Claims 4, 20 and 30 are patentable over Brown et al. (US 5,807,522) and Tisone et al. (US 6,063,339) and further in view of Gamble et al. (US 5,958,342) under 35 U.S.C. 103(a) because these references fail to teach or suggest each and every element of the claimed invention. The Examiner cited Gamble et al merely for its asserted teaching of using pulse jet dispensers in array fabrication. However, because Gamble et al. fails to provide teachings with regard to *Groups*, *Sets*, *Series*, or *Frames* of dispensers, they fail to fill the fundamental deficiencies in Brown et al. and Tisone et al.

RELIEF REQUESTED

The Appellants respectfully request that the rejections of claims 1-33 under 35 U.S.C. §103(a) be reversed, and that the application be remanded to the Examiner with instructions to issue a Notice of Allowance.

Respectfully submitted,

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Date: 10.28.05

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CLAIMS APPENDIX

1. A method of fabricating a chemical array using:

a head system with multiple groups of drop dispensers;

a transport system to move the head system with respect to a substrate;

a processor to dispense droplets from dispensers during operation of the transport system, in a pattern along a selected path for each group;

the method comprising:

a) loading the dispensers with fluid such that each dispenser group has at least one set of redundant dispensers loaded with a same fluid;

b) dispensing drops from the dispensers to identify an error in one or more dispensers;

c) moving a first dispenser of each set in each group along the selected path for that group while dispensing drops from non-error first dispensers of the sets in at least part of the pattern along the selected path for each group;

d) moving a second dispenser of the sets in each group along the selected path for that group while dispensing drops from a non-error second dispenser of a set having an identified error first dispenser, in at least part of the pattern for the selected path of the first group; and

e) repeating (a) through (d) at least once;

wherein the array is fabricated.

2. A method according to claim 1 wherein in step (d) drops are dispensed from each second dispenser of multiple groups in at least part of the pattern for the selected path of the same group.

3. A method according to claim 2 wherein:

dispensers within a set of redundant dispensers communicate with a common reservoir for that set.

4. A method according to claim 1 wherein the dispensers are pulse jets.

5. A method according to claim 2 wherein in (d) the drops are dispensed from at least one second dispenser of a set of redundant dispensers, in the complete pattern for the first dispenser of the same set.

6. A method of fabricating a chemical array using:

a head system with multiple groups of dispensers, the members of each group being arranged in multiple series extending in a first direction and multiple sets;

a transport system to move the head system with respect to a substrate with different series following respective paths, series from different groups which can simultaneously move along the selected paths for their groups forming a dispenser frame;

a processor to dispense drops from dispensers during operation of the transport system, in a pattern along a selected path for each group;

the method comprising:

a) loading the dispensers with fluid such that dispensers within each set of the groups are loaded with a same fluid;

b) dispensing drops from the dispensers to identify an error in one or more dispensers;

c) moving a first dispenser frame along the selected paths for the groups while dispensing drops from non-error dispensers of the first frame in at least part of the patterns along the selected paths for the groups;

d) when an error dispenser is detected in the first frame, moving a further frame along the selected paths for the groups while dispensing drops from a non-error dispenser of the further frame located in the same set as the error dispenser, in at least part of the patterns along the selected paths for the groups; and

e) repeating (a) through (d) at least once;

wherein the array is fabricated.

7. A method according to claim 6 wherein the multiple sets extend in a second direction sideways to the first direction

8. A method according to claim 7 wherein the selected paths extend in the first direction.

9. A method according to claim 7 wherein the dispensers of the head system move in unison.

10. A method according to claim 7 wherein the first and further dispenser frames are moved in turn along the selected paths.

11. A method according to claim 8 wherein the head is displaced sideways to the selected paths to bring each further frame into alignment with the selected paths.

12. A method according to claim 8 wherein the first frame is selected based on the number of non-error dispensers in the first frame.

13. A method according to claim 8 wherein in (d) when error dispensers are detected in a further frame, then multiple further frames are moved along the selected paths for the groups while dispensing drops from non-error dispensers of each of the further frames in at least part of the patterns along the selected paths for the groups.

14. A method according to claim 13 wherein drops are dispensed from non-error dispensers in the same sets as the error dispensers.

15. A method according to claim 8 wherein in (c) and (d) frames so moved are each selected as a frame among previously non-selected frames which has the highest number of non-error dispensers in sets not containing a non-error dispenser in a previously selected frame.

16. A method according to claim 15 wherein when more than one frame has the highest number then selecting from among such highest number frames a frame which has a best non-error dispenser in a set not containing a non-error dispenser in a

previously selected frame, wherein the best non-error dispenser more closely meets a predetermined criterion than a non-error dispenser of another highest number frame.

17. A method according to claim 15 additionally comprising, when a set contains a non-error dispenser in more than one selected frame, then determining a best dispenser from among those non-error dispensers which more closely meets a predetermined criterion and dispensing drops in at least part of the pattern along the selected path for that group in which that best dispenser is located when the frame containing that best dispenser is moved along the selected path for that group.

18. A method according to claim 16 wherein the predetermined criterion is a drop size.

19. A method according to claim 16 wherein the predetermined criterion is a drop placement.

20. A method according to claim 7 wherein the dispensers are pulse jets.

21. A method according to claim 12 wherein:

dispensers in each of multiple sets of each of multiple groups, communicate with a corresponding common reservoir for that column.

22. A method according to claim 7 wherein the dispensing of (b) is performed after each loading in (a) and before the moving and dispensing of (c) and (d).

23. A method according to claim 7 wherein the series are arranged in rows.

24. A method according to claim 7 wherein the sets are arranged in columns.

25. A method of fabricating a chemical array using:

a head system with multiple groups of dispensers, the members of each group being arranged in multiple series extending in a first direction and multiple sets extending in a second direction sideways to the first direction;

a transport system to move the head system with respect to a substrate with different series following respective paths, series from different groups which can simultaneously move along the selected paths for their groups forming a dispenser frame;

a processor to dispense drops from dispensers during operation of the transport system, in a pattern along a selected path for each group;

the method comprising:

a) loading the dispensers with fluid such that dispensers within each set of the groups are loaded with a same fluid;

b) dispensing drops from the dispensers to identify an error in one or more dispensers;

c) moving a first frame along the selected paths for the groups while dispensing drops from non-error dispensers of the first frame in at least part of the patterns along the selected paths for the groups; and

d) when an error dispenser is detected in the first frame, then multiple selected frames are moved along the selected paths for the groups while dispensing drops from non-error dispensers of each of the frames in at least part of the patterns along the selected paths for the groups, wherein each of the frames so moved is selected as the frame among previously non-selected frames which has the highest number of non-error dispensers in sets not containing a non-error dispenser in a previously selected frame;

wherein the array is fabricated.

26. A method according to claim 25 wherein the selected paths extend in the first direction.

27. A method according to claim 25 wherein the dispensers of the head system move in unison.

28. A method according to claim 25 wherein the first and further dispenser frames are moved in turn along the selected paths.

29. A method according to claim 26 wherein the head is displaced sideways to the selected paths to bring each further frame into alignment with the selected paths.

30. A method according to claim 25 wherein the dispensers are pulse jets.

31. A method according to claim 25 wherein:

dispensers in each of multiple sets of each of multiple groups, communicate with a corresponding common reservoir for that column.

32. A method according to claim 25 wherein the series are arranged in rows.

33. A method according to claim 26 wherein the sets are arranged in columns.

EVIDENCE APPENDIX

No evidence that qualifies under this heading has been submitted during the prosecution of this application, and as such it is left blank.

RELATED PROCEEDINGS APPENDIX

As stated in the *Related Appeals and Interferences* section above, there are no other appeals or interferences known to Appellants, the undersigned Appellants' representative, or the assignee to whom the inventors assigned their rights in the instant case, which would directly affect or be directly affected by, or have a bearing on the Board's decision in the instant appeal. As such this section is left blank.